Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application. In particular, please amend claims 1 and 2 as follows.

1. (Currently Amended) A method of forming an electrical device including providing a substrate having a first dielectric upper layer, forming a depression in said first dielectric upper layer, filling said depression with an electrically conductive film having an electrical resistivity and an upper surface that is co-planar with the first dielectric upper layer, said method comprising:

reacting a chemical composition with said upper surface to form a passivating layer over the upper surface, wherein said passivating layer has a thickness of less than about 50 Å, wherein the step of reacting a chemical composition with said upper surface to form a passivating layer comprises:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and

forming a second dielectric upper layer over said electrically conductive film and said first dielectric upper layer, wherein:

at least an exposed surface of the electrically conductive film is unoxidized; and

said second dielectric upper layer is adhered to said electrically conductive film.

2. (Currently Amended) The method as defined in Claim 1, wherein reacting a chemical composition with said upper surface <u>further</u> comprises:

providing a nitrogen-containing composition;

heating said first dielectric upper layer; and

exposing said upper surface to said nitrogen-containing composition to form a chemical reaction compound having a higher resistance to oxidation than said electrically conductive film.

3. (Previously Presented) The method as defined in Claim 1, wherein forming a second dielectric upper layer over said electrically conductive film and said first dielectric upper layer comprises *in situ* depositing said second dielectric upper layer over said electrically conductive film and said first dielectric upper layer while simultaneously reacting said chemical composition with at least one monolayer of said upper surface.

4. (Previously Presented) The method as defined in Claim 1, wherein forming a second dielectric upper layer over said electrically conductive film and said first dielectric upper layer comprises *in situ* depositing said second dielectric upper layer over said electrically conductive film and said first dielectric upper layer after reacting said chemical composition with at least one monolayer of said upper surface.

5. (Previously Presented) The method as defined in Claim 2, wherein the step of heating said first dielectric upper layer comprises initially heating said first dielectric layer to a first temperature and thereafter heating said first dielectric layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said upper surface than the second temperature.

6. (Previously Presented) A method of forming an electrical device including providing a substrate having a first dielectric upper layer; forming a depression in said first dielectric upper layer, filling the depression with an electrically conductive film having an upper surface that is co-planar with the first dielectric upper layer, said method comprising:

reacting a chemical composition with said upper surface to form a passivation layer having a thickness not greater than about 50Å upon the upper surface, the step of forming the passivation layer comprising heating said first dielectric upper layer to a first temperature and thereafter heating said first dielectric upper layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said dielectric upper layer than the second temperature; and

forming a second dielectric upper layer over said electrically conductive film and said first dielectric upper layer, wherein:

at least an exposed surface of the electrically conductive film is unoxidized;

said second dielectric upper layer is adhered to said electrically conductive film.

7. (Previously Presented) The method as defined in Claim 6, wherein the passivation layer upon the upper surface has a thickness in a range from about 2Å to about 20 Å.

8. (Previously Presented) The method as defined in Claim 6, wherein reacting said chemical composition comprises forming a passivation layer upon said upper surface that is adsorbed onto said upper surface.

9. (Previously Presented) The method as defined in Claim 6, wherein said passivation layer is formed by the steps comprising:

forming a first layer by chemically reacting components of said chemical composition and said upper surface; and

forming a second layer by adsorbing portions of said chemical composition onto said first layer.

10. (Previously Presented) A method of forming an electrical device, the method comprising:

forming an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;

forming a first passivation layer by reacting a chemical composition with from about 1 to about 1,000 atomic lattice layers of said upper surface, said passivation layer disposed upon said upper surface and having a thickness of less than about 50 Å, said first passivation layer including chemical reaction products and solid solution mixtures between said electrically conductive interconnect and a chemical compound, the step of forming the passivation layer comprising:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and

forming an ILD disposed upon said first dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

11. (Original) The method as defined in Claim 10, wherein forming said electrically conductive interconnect further comprises:

forming a first titanium liner layer within a depression in said first dielectric layer;

forming a first titanium nitride layer upon said first titanium liner layer; and

forming a tungsten film upon said first titanium nitride layer so as to fill the depression.

12. (Original) The method as defined in Claim 10, wherein forming said first passivation layer further comprises forming a first tungsten nitride layer upon said upper surface, wherein said first tungsten nitride layer has a thickness of less than about 50 Å.

13. (Original) The method as defined in Claim 10, further comprising forming a second passivation layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer, wherein said first passivation layer comprises a tungsten nitride compound.

14. (Original) The method as defined in Claim 10, wherein said first passivation layer comprises a layer upon said upper surface comprising ammonia and its derivatives that is adsorbed upon said upper surface.

15. (Previously Presented) A method of forming an electrical device, the method comprising:

forming an electrically conductive interconnect disposed within a dielectric layer, said electrically conductive interconnect having an upper surface, and further including the steps of:

forming a titanium liner layer disposed within a depression in said dielectric layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer and filling said depression;

in situ forming:

a passivation layer composed of tungsten nitride, disposed upon said upper surface, and having a thickness of less than about 50 Å, wherein the step of forming the passivation layer comprises heating said first dielectric layer to a first temperature and thereafter heating said first dielectric layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said upper surface than the second temperature; and

an ILD disposed upon said dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

16. (Previously Presented) A method of forming an electrical device, the method comprising:

forming an electrically conductive interconnect having an upper surface and being disposed within a dielectric layer, and further including the steps of:

forming a titanium liner layer disposed within a depression in said dielectric layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer and filling said depression;

forming first and second passivation layers by protecting from about 1 to about 1,000 atomic lattice layers of said upper surface, said first and second passivation layers comprising:

a first passivation layer comprising a tungsten nitride compound and being disposed upon said upper surface;

a second passivation layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer; and

forming an ILD disposed upon said dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

17. (Previously Presented) A method of forming an electrical device, the method comprising:

forming an electrically conductive interconnect disposed within a dielectric layer, said electrically conductive interconnect having an upper surface, and further including the steps of:

forming a titanium liner layer disposed within a depression in said dielectric layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer and filling said depression;

forming a passivation layer disposed upon said upper surface comprising ammonia and its derivatives that are adsorbed upon said upper surface, wherein:

the step of forming the passivation layer comprises heating said first dielectric layer to a first temperature and thereafter heating said first dielectric layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said upper surface than the second temperature; and

the step of forming the passivation layer further comprises:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and

forming an ILD disposed upon said dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

18. (Previously Presented) A method of forming an interconnect in an electronic device, the method comprising:

forming a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface;

forming a passivation layer disposed upon said upper surface, said passivation layer including chemical reaction products and solid solution mixtures between said metallic structure and a chemical compound, wherein:

the step of forming the passivation layer comprises heating said first dielectric layer to a first temperature and thereafter heating said first dielectric layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said upper surface than the second temperature; and

the step of forming the passivation layer further comprises:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and; and

forming a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

19. (Cancelled)

20. (Original) The method as defined in Claim 18, wherein:

said passivation layer further comprises forming a tungsten nitride layer disposed upon said upper surface; and

said tungsten nitride layer having a thickness of less than about 50 Å.

21. (Original) The method as defined in Claim 18, further comprising forming a second layer comprising ammonia and its derivatives that is adsorbed upon said passivation layer, wherein said passivation layer comprises a tungsten nitride compound.

22. (Original) The method as defined in Claim 18, wherein said passivation layer comprises a layer upon said upper surface comprising ammonia and its derivatives that is adsorbed upon said upper surface.

23. (Previously Presented) A method of forming an interconnect in an electronic device, the method comprising:

forming a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface, and further including the steps of:

forming a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer;

forming a passivation layer composed of tungsten nitride, having a thickness of less than about 50 Å, and being disposed upon said upper surface, the step of forming the passivation layer comprising:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and

forming a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

24. (Previously Presented) A method of forming an interconnect in an electronic device, the method comprising:

forming a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface, and further including the steps of:

forming a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer;

forming first and second passivation layers to chemically protect from said upper surface, the step of forming the first and second passivation layers comprising heating said first silicon oxide layer to a first temperature and thereafter heating said first silicon oxide layer to a second temperature, wherein the first temperature is less favorable to the formation of an oxide husk on said upper surface than the second temperature, the first and second passivation layers comprising:

a first passivation layer disposed upon said upper surface and composed of a tungsten nitride compound; and

a second passivation layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer; and

forming a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface

25. (Previously Presented) A method of forming an interconnect in an electronic device, the method comprising:

forming a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface, and further including the steps of:

forming a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

forming a titanium nitride layer disposed upon said titanium liner layer; and

forming a tungsten film disposed upon said titanium nitride layer;

forming a passivation layer disposed upon said upper surface and composed of ammonia and its derivatives that is adsorbed upon said upper surface, the step of forming the passivation layer comprising:

exposing the upper surface to a plasma having a first concentration of a chemical composition used to form the passivation layer; and

incrementally reducing the concentration of the chemical composition until it is completely removed from the presence of the upper surface; and

forming a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

26. (Previously Presented) A method according to claim 1, wherein said chemical composition comprises nitrogen-containing silane.

27. (Previously Presented) A method according to claim 6, wherein said chemical composition comprises nitrogen-containing silane.

28. (Previously Presented) A method according to claim 23, wherein the step of incrementally reducing the concentration of the chemical composition comprises reducing the concentration of the chemical composition by a selected percentage at regular intervals until the concentration equal is about zero.